

What is claimed is:

- 1 1. A cutting tool insert comprising:
2 a cemented carbide body comprising
3 6-15 weight % Co, 0.2-1.8 weight % cubic carbides of Ti, Ta, Nb
4 or any combination thereof, a highly W-alloyed binder phase with a CW-
5 ratio of 0.78-0.93, and the balance WC; and
6 a coating comprising
7 a first innermost layer of $\text{TiC}_x\text{N}_y\text{O}_z$ wherein $x+y+z=1$, the first
8 layer having a thickness of 0.1-1.5 μm and equiaxed grains with size <0.5
9 μm ,
10 a second layer of $\text{TiC}_x\text{N}_y\text{O}_z$ wherein $x+y+z=1$, the second layer
11 having a thickness of 0.4-3.9 μm , with columnar grains with an average
12 diameter of 0.1-5.0 μm ,
13 a third layer of a smooth fine-grained $\kappa\text{-Al}_2\text{O}_3$ layer with a
14 thickness of 0.5-5.5 μm , and
15 a total thickness of the first innermost $\text{TiC}_x\text{N}_y\text{O}_z$ and the second
16 $\text{TiC}_x\text{N}_y\text{O}_z$ layer is 0.5-4.0 μm , and the total thickness of all layers is 2.0-
17 6.0 μm .
- 1 2. The cutting tool insert of claim 1, wherein the body comprises 9-12
2 weight % Co and a CW ratio of 0.80-0.91.
- 1 3. The cutting tool inset of claim 1, wherein in the first layer $y > x$ and
2 $z < 0.2$, and the thickness of the first layer is 0.1-0.6 μm .
- 1 4. The cutting tool insert of claim 1, wherein in the second layer $z=0$,
2 $x > 0.3$ and $y > 0.3$, the second layer has a thickness of 1.5-3.0 μm , with the
3 columnar grains having an average diameter of 0.1-2.0 μm .

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1 5. The cutting tool insert of claim 1, wherein in the third layer the grains
2 of the $\kappa\text{-Al}_2\text{O}_3$ have a size on the order of $0.5\text{-}2.0\ \mu\text{m}$, and the third layer has a
3 thickness of $0.5\text{-}3.0\ \mu\text{m}$.

1 6. The cutting tool insert of claim 1, wherein the total thickness of the first
2 and second layers is $1.5\text{-}3.5\ \mu\text{m}$.

1 7. The cutting tool insert of claim 1, wherein the total thickness of all the
2 layers is $3.0\text{-}5.0\ \mu\text{m}$.

1 8. The cutting insert of claim 1 further comprising an outermost layer of
2 TiN having a thickness of $0.1\text{-}1.0\ \mu\text{m}$.

1 9. The cutting insert of claim 8, wherein the outermost TiN-layer has been
2 removed along the cutting edge.

1 10. A method of making a cutting tool insert comprising a WC-Co-based
2 cemented carbide body with a highly W-alloyed binder phase and a CW-ratio of
3 $0.78\text{-}0.93$, the method comprising coating the body by the steps of:

4 forming a first innermost layer of $\text{TiC}_x\text{N}_y\text{O}_z$ with a CVD-based technique,
5 wherein $x+y+z=1$, the first layer having a thickness of $0.1\text{-}1.5\ \mu\text{m}$ and equiaxed
6 grains with a size $<0.5\ \mu\text{m}$,

7 forming a second layer of $\text{TiC}_x\text{N}_y\text{O}_z$ by a MTCVD-technique, wherein
8 $x+y+z=1$, the second layer having a thickness of $0.4\text{-}3.9\ \mu\text{m}$ and columnar grains
9 with an average diameter of $0.1\text{-}5.0\ \mu\text{m}$,

10 forming a third layer of a smooth $\kappa\text{-Al}_2\text{O}_3$ having a thickness of $0.5\text{-}5.5$
11 μm , and

12 forming the layers such that the total thickness of the first and second
13 layers is 0.5-4.0 μm , and the total thickness of all layers is 2.0-6.0 μm .

1 11. The method of claim 10, wherein the step of forming the first layer
2 further comprises providing the first layer with $y > x$ and $z < 0.2$ and a thickness
3 of 0.1-0.6 μm .

1 12. The method of claim 10 wherein the step of forming the second layer
2 further comprises using acetonitrile as the carbon and nitrogen source and forming
3 the second layer at a temperature of 850-900°C, the step of forming the second
4 layer further comprises providing $z = 0$, $x > 0.3$ and $y > 0.3$, a thickness of 1.5-3.0
5 μm , and with the columnar grains having an average diameter of 0.1-2.0 μm .

1 13. The method of claim 10, wherein the third layer is provided with a
2 thickness of 0.5-3.0 μm .

1 14. The method of claim 10, wherein the method further comprises
2 forming an outer layer of TiN having a thickness of $< 1\mu\text{m}$.

1 15. The method of claim 10, wherein the method further comprises
2 providing the first and second layers with a total thickness of 1.5-3.5 μm , and a
3 total thickness of all layers of 3.0-5.0 μm .

1 16. The method of claim 10 wherein the said cemented carbide body has a
2 cobalt content of 9-12 weight % and 0.4-1.8 weight % cubic carbides of Ta and
3 Nb.

1 17. The method of claim 10 wherein the cemented carbide body has a
2 cobalt content of 10-11 weight %.

1 18. The method of claim 17 wherein the cemented carbide body has a CW-
2 ratio of 0.82-0.90.

1 19. The method of claim 14, wherein the outermost TiN-layer is removed
2 along a cutting edge.

1 20. The method of claim 19, wherein the outermost TiN-layer is removed
2 by brushing.

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